2.0 EXISTING CONDITIONS

Land use, population and traffic growth trends, along with safety and capacity deficiencies, were investigated as part of the transportation plan update. Information gathered from these investigations helped define existing conditions, as well as establish growth trends and the basis for defining transportation needs.

2.1 LAND USE

Existing and future land use for the area was reviewed to gain a better understanding of potential changes in major trip generators, economic growth factors ,and the potential for additional growth and expansion. The Mankato area was established as an agricultural and trade center in the 1800s due to its close proximity to the Minnesota River. Today, these agricultural activities remain a significant portion of the local economy; however, medical, education, manufacturing, retail and government services are also key economic factors that led to a more diversified economy.

While there has been a significant amount of commercial and residential growth in some portions of the study area, local communities and public officials have worked together to promote orderly development in the region as a whole. The City of Mankato and Mankato Township have developed an orderly annexation agreement that prohibits additional plats outside the City. In addition, Blue Earth County has adopted strict zoning ordinances that govern land use in South Bend and Lime Township. Similar practices exist in Nicollet County where no residential development is permitted outside urban areas. Le Sueur County will be updating its land use and zoning ordinances to better limit growth outside of incorporated areas.

There are three locations where municipal services have been extended into the rural areas. Sewer services currently extend west of North Mankato to the North Links Golf Course on Nicollet County Road 6, east of Mankato along TH 14 to the City of Eagle Lake, and to the northeast of Mankato to serve the airport. Additional urban services have been discussed to address a variety of environmental concerns (septic problems). This includes extension of services north of Mankato to serve residents along Lake Washington in Le Sueur County and additional services to Le Hillier and Mount Kato areas. While extending urban services may address environmental concerns, there are some concerns that these extensions may lead to additional development in rural areas.

Areas where future growth is most likely to occur were identified during meetings with the cities, counties and townships. These growth areas, as well as the existing urban area limits, are shown in Figure 4. As the figure shows, a significant amount of growth has occurred and is planned for on the eastern side of Mankato near TH 22. Please refer to Chapter 6 for additional information on the existing and planned growth near TH 22. In addition, growth in industrial and manufacturing businesses is expected to continue to grow in the northwestern corner of the City of North Mankato. Residential growth in both communities is expected to remain steady.

Figure 4 – Growth Areas and Existing Urban Areas

The major business and economic sectors in the area are summarized below:

- **Manufacturing Activities:** The primary industrial activity in the study area continues to be centered on agricultural products. Harvest States, Cargill, Hubbard and Archer Daniels Midland (ADM) are large processors of agriculture-related products in the Mankato area. Mankato also serves as a large supplier of crushed limestone and dimension limestone quarry rock. Other area industrial activities include the manufacture of electrical generators, concrete products, metal fabrication, plastics, electrical components, packaging and fishing equipment, as well as distribution centers for True Value Hardware and various food, beverage and fuel distributors. The Taylor Corporation in North Mankato continues to expand its existing businesses, as well as develop new businesses. This business expansion and the attraction of additional businesses have contributed to the development of North Mankato's industrial sector.

- **Government and Education Activities:** The Mankato area serves as a regional center for government and educational services. Government offices include: National Guard, regional post office, Minnesota Department of Agriculture, Minnesota Department of Economic Security, Minnesota Department of Health, Minnesota Department of Natural Resources, Minnesota Department of Public Safety, Minnesota Department of Revenue, Minnesota Department of Transportation, Region Nine Development Commission, Minnesota Valley Action Council, regional library, Fifth Judicial District, and county and city offices. Educational facilities include: Minnesota State University, Mankato; South Central Technical College; Bethany Lutheran College; and Rasmussen Business College. Students have historically accounted for approximately 25 percent of the population in the Mankato area.

- **Recreational Activities:** The Mankato area has become a regional destination for recreational activities, including shopping, skiing, bicycling, hiking and dining. In addition, the downtown Civic Center in Mankato attracts a number of entertainment events throughout the year.

- **Medical and Professional Services:** The Mankato area acts as a regional medical center for much of southwest Minnesota. The Mankato Clinic has more than doubled the number of physicians it employed between 1992 and 2002. Continued expansion of the clinic's facilities and staff is expected as additional specialties are added and growth in hospital service continues to increase (the Mayo Clinic has expanded services to the Mankato area through Immanuel St. Joseph's - Mayo Health System). Professional employment opportunities in the Mankato area have increased with the need for doctors, lawyers, accountants and computer professionals to service the growing population and geographic area.

2.2 POPULATION

Traffic growth and growth in other transportation modes and services generally result from changes in regional population, land use changes and changes in travel patterns. One of the first steps in estimating the future traffic growth for the region is to examine historic population trends for the area. Over the past 15 to 20 years, statewide trends suggest that the population is shifting from rural areas and small rural communities to larger urban and suburban centers. The larger urban centers are able to provide increased medial services, recreational, shopping and employment opportunities that the smaller rural areas need and are unable to provide for themselves. The trend is evident in the study region, where overall population of the nine counties in Region Nine grew very little, only 6,470 persons or 3 percent between 1990 and 2000. In spite of the slight increase for the region as a whole, the Cities of Mankato and North Mankato grew by 2,584 people or 40 percent of the growth for the region.

Population changes for the study area were developed using U.S. Census data, Minnesota State Demographer projections and population estimates from study partners. Table 1 identifies historic growth trends, as well as future population projections. The following observations have been noted about growth trends in the area:

- Population in the study area grew by approximately 2.5 percent per year during the 1960s. Much of the growth during this period is attributed to the growth at Minnesota State University, Mankato (formerly known as Mankato State University).

- Due to inflationary pressures and a difficult agricultural climate, the population remained fairly constant through the 1970s.

- Between 1980 and 1990 the study area added approximately 3,000 people, a growth rate of 1 percent per year.

- A rising economy and growth in regional trade centers between in the late 1990s led to increased commercial and retail growth in the study area. Population, however, remained fairly constant with a growth rate of 1 percent per year. It should be noted that much of the growth that occurred during this time period occurred in the latter half of the decade.

- Over the next 20 years (2000 to 2020), the population is projected to grow at approximately 1 percent per year.

- Population in the study area is aging. The growth in the elderly population will increase the demand for access to medical, recreational and community services that assist elderly populations. Transportation services, including non-auto options, will become increasingly important as elderly populations become unable to drive.

- The Mankato area will continue to serve as a regional center for retail, recreational, medical, service and entertainment activities. Continued growth in these areas will draw more traffic into the area.

TABLE 1
Population Growth and Projections

Government Unit	Historic Population				Population Estimates*		Annual Growth Rate	
	1970	1980	1990	2000	2010	2025	1970 to 2000	2000 to 2025
Mankato	30,895	28,651	31,477	32,427	35,162	39,214	1.00	1.01
North Mankato	7,347	9,145	10,164	11,798	13,032	15,130	1.02	1.01
Eagle Lake	839	1,470	1,703	1,787	1,974	2,292	1.03	1.01
Madison Lake	587	592	643	837	925	1,073	1.01	1.01
Blue Earth County	52,322	52,314	54,044	55,941	56,690	56,530	1.00	1.00
Nicollet County	24,518	26,929	28,076	29,771	31,960	31,820	1.01	1.00
Mankato Township	1,952	2,752	2,135	1,833	2,025	2,351	1.00	1.01
Lime Township	1,078	1,101	1,156	1,314	1,451	1,685	1.01	1.01
South Bend Township	1,397	1,514	1,515	1,491	1,647	1,912	1.00	1.01
Belgrade Township	1,052	1,118	1,456	1,033	1,141	1,325	1.00	1.01
Kasota Township	959	1,252	1,303	1,487	1,643	1,907	1.01	1.01
Minnesota State University	12,500	13,000	14,000	13,225	14,000	14,000	NA	NA
Totals: Blue Earth and Nicollet Counties	76,840	79,243	82,120	85,712	94,679	109,920	1.00	1.01
Primary Study Area**	44,680	45,533	49,206	51,383	56,101	63,524	1.00	1.01

* Population estimates were made using a 1% annual growth rate for all communities except for the City of Mankato and Blue Earth and Nicollet Counties. State Demographer estimates were used for Blue Earth and Nicollet Counties; the City of Mankato provided its own estimates.

** The Primary Study Area contains the Cities of Mankato and North Mankato and the five townships.

- Many of the government and educational services in the Mankato area are anticipated to remain stable over the next 10 to 15 years. Minnesota State University, Mankato has a current enrollment of 13,225 students. While applications are up 50 percent in the 2002-2003 school year, Minnesota State University, Mankato projects little growth in enrollment due to size and budget constraints. The existing trend for government agencies is to streamline processes and to continue to provide a high level of service with the same number or fewer employees. Therefore, many government and educational functions in the study area are assumed to remain stable through the year 2020.

- Business growth and expansion are anticipated to continue at a moderate pace within the study area. Northeast and east Mankato have shown significant retail growth and development, and additional plans are being formulated for more commercial areas. North Mankato expects continued industrial growth in the northwest portion of its city. The Mankato area is considered to have close to full employment, even with the recession, and the expansion of businesses or new businesses will be needed to attract additional workers.

2.3 TRAFFIC VOLUMES

Annual average daily traffic volumes (AADTs) on major highways and road segments in the study area were collected using the most recent Mn/DOT traffic volume maps, as well as from traffic counts from individual studies that have occurred in the area. The existing volumes are shown in Figure 5. The historical volumes for the individual segments and their associated growth rates are shown in Appendix A.

In general, traffic volumes tend to increase as they approach the Mankato area. Additionally, volumes on the major routes that extend to the north and east (toward the Twin Cities and Rochester, respectively) have higher volumes than routes that extend to the south and west.

2.4 CONGESTION

Existing daily traffic volumes were reviewed to identify congested areas. By identifying segments with congestion or operational problems, improvement options can be investigated and planned (i.e., roadway improvements, intersection control changes, alternative routes, setback requirements, etc.). In addition, access controls and other management tools can be targeted for these corridors to improve their traffic operations until major improvements are completed.

For the purposes of this analysis, threshold volumes were developed for 11 different types of roadways using the Highway Capacity Manual (HCM) and typical traffic characteristics (i.e., percent peak hour, directional split, percent no passing, number of access points, signalized intersections per mile) for each roadway type. The threshold volumes are the volumes at which operational problems may occur (traffic backups, side street delays, slower speeds, etc.). The

Figure 5– Existing Traffic Volumes

threshold volumes are shown in Appendix A for seven types of urban facilities and four types of rural facilities. Threshold volumes were then compared to existing traffic volumes for each of the segments in the study area and placed in one of the following categories:

Uncongested: Existing volumes are less than 85 percent of the threshold volume. This percent suggests that there will be a low probability of operational problems due to the volume of traffic on the facility.

Near Congested: Existing volumes are between 85 and 105 percent of the threshold volume. There is a moderate probability of operational problems due to traffic volumes on the facility.

Congested: Existing volume exceeds 105 percent of the threshold volume for the facility. There is a high probability of operational problems due to traffic volumes on the facility.

Figure 6 shows the current levels of congestion for the key arterial and collector facilities in the study area. It should be noted that this methodology is a planning-level analysis that uses average daily traffic volumes. This analysis is not appropriate for abnormal traffic conditions. For example, traffic conditions that do not fit the average daily traffic criteria (e.g., holiday travel periods, fall agricultural volumes or special events) are likely to produce different levels of congestion. A good example of this is Adams Street near the River Hills Mall, where weekend and holiday conditions may exceed capacity. In addition, there may be some locations were the lack of turn lanes, inadequate geometrics or inappropriate signal timing may cause congestion. Based on the information received during the small-group meetings held with study partners and other groups, congestion was not perceived as a significant problem in the region overall, with the exception of the roads near the mall area in Mankato.

The analysis of the existing roadway system and its corresponding daily traffic levels indicated that there are no congested segments in the MATAPS study area. The previous plan had identified Riverfront Drive from BEC CSAH 16 (Stoltzman Road) to Warren Street as a congested segment. Due to the continued shift of many economic activities to the River Hills Mall area, Riverfront Drive is no longer congested. In addition, the opening of Stadium Road to the east and intersection improvements at Riverfront Drive and BEC CSAH 16 (Stoltzman Road) have also eased congestion.

Although the number of congested segments decreased from the previous plan, the number of segments near congested increased from four to eight. In the previous plan, Belgrade Avenue, Riverfront Drive, Warren Street, TH 14 and Adams Street were identified as near congested. The analysis for the study update revealed that the following segments are currently considered near congested:

1. BEC CSAH 16 (Stoltzman Road) from BEC CSAH 60 (Stadium Drive) to West Pleasant Street (Mankato)
2. South Riverfront Drive between Poplar and BEC CSAH 16 (Stoltzman Road) (Mankato)

Figure 6 – Existing Level of Congestion

3. BEC CSAH 60 (Stadium Road) between Warren Street and BEC CSAH 8 (Monks Avenue) (Mankato)
4. Glenwood Avenue between Division Street and Monks Avenue (Mankato)
5. Main Street between Division Street and Dickinson Street (Mankato)
6. Madison Avenue between North Riverfront Drive and 7th Street (Mankato)
7. North Riverfront Drive between Madison Avenue and Lime Street (Mankato)
8. Belgrade Avenue between Sherman Street and Range Street (North Mankato)

While a segment may be shown as congested or near congestion, this is only an indication of a potential problem. A more detailed traffic study should be undertaken before any improvements are made. Sometimes segments may have little to no access and relatively little cross traffic, which can result in the ability of the facility to accommodate higher volumes. As long as access remains limited, it is likely that the roadways will operate better than the analysis would indicate**.** Warren Street from Balcerzak to Highland Avenue is an example of this. The MATAPS '96 Plan shows this segment as uncongested. The 2025 level of service analysis shows volumes on this roadway that suggest a congested designation; however, little congestion is evident on this segment.

2.5 SAFETY AND CRASH ANALYSIS

The safety of the transportation network is a high priority for the study partners, as well as for all agencies that are responsible for improving and maintaining transportation facilities. To evaluate potential safety problems in the study area, a crash analysis was performed using Department of Public Safety (DPS) crash records from 1999 through 2001. Records from the DPS are collected for state trunk highways, county state aid highways and municipal state aid roadways. The crash database was imported into a Geographic Information System (GIS) format so that the data could be viewed on a map of the study area.

The analysis of the crash data focused on identifying problems at intersections and on roadway segments. The analysis is described in the following sections.

Intersection Crashes

Intersections with potential problems were identified using GIS technology and the crash data from 1999 through 2001. Because many intersection-related crashes do not occur directly at the intersection, a buffer was created around the intersections. The size of the buffer varied depending upon the speed of the road segment. For example, on routes that had posted speeds of 50 miles per hour (mph) or higher, a 500-foot buffer was used. This length roughly represents the length of a typical turn lane. On routes with posted speeds less than 50 mph, a 250-foot buffer was used. All crashes within the buffer area were then tallied for each intersection. The shape of the buffer area was adjusted to avoid overlap and double-counting of crashes at closely-spaced intersections.

Each of the intersections was categorized into one of three groups: intersections with more than 30 crashes (more than ten per year); intersections with more than 15 but fewer than 30 crashes (six to ten crashes per year); and intersections with more than three but fewer than 15 crashes (one to five crashes per year). The results of the analysis show that there are 12 intersections that had more than 30 crashes for the three-year period, and 27 intersections that had between 16 and 30 crashes (Figure 7).

The higher crash intersections generally reflect areas where there are higher traffic volumes and/or a number of access points. Of the 12 highest crash locations, nine of them are located either on Madison Avenue or TH 22. A majority of these nine are located near the retail area in Mankato. Each of the intersections that had more than 30 crashes during the three-year period between 1999 and 2001 was further evaluated in terms of crash type and severity. The results are summarized below and highlighted in Table 2.

- **TH 22 Corridor:** Three of the high crash locations are located on TH 22 near the River Hills Mall area. This portion of TH 22 is a four-lane urban facility with left and right turn lanes at signalized intersections. Traffic volumes on this section of TH 22 range from 14,400 to 30,300 vehicles per day. The highest number of crashes, 60, occurred at the intersection of TH 22 and Adams Street. Just to the south at TH 22 and Madison Avenue, another 44 crashes were reported; and to the north at the intersection of TH 14 and TH 22, 34 crashes were identified. Most of the crashes at all three of these intersections were rear-end crashes, accounting for 50-64 percent of the crashes. Although the majority of the crashes along this segment resulted in property damage, injuries were recorded in approximately 28 percent of the incidents. In addition, there was one fatality recorded at the intersection of TH 22 and Adams Street.

- **Madison Avenue Corridor:** Madison Avenue is a four-lane urban arterial route. Traffic volumes on Madison Avenue range from 18,100 near the mall area to 25,000 vehicles per day near its connection at Riverfront Drive. Six of the high crash locations are located on this corridor (the seventh high crash intersection on Madison Avenue is located at the intersection with TH 22 – this intersection is referenced in the previous bullet). A majority of crashes along this corridor were rear-end and right-angle crashes. Crashes at Riverfront Drive, Victory Drive and Long Street were characterized by a high number of rear-end crashes (22, 58 and 60 percent respectively). Right-angle crashes accounted for 37 to 44 percent of crashes at Sioux Road, Broad Street and Raintree Road. Crashes that resulted in injury occurred approximately 36 percent of the time. Two of the crashes recorded at the intersection of Madison Avenue and Sioux Road resulted in severe injury. One fatality and three severe injury crashes were recorded at the intersection of Madison Avenue and Riverfront Drive. In addition to the six high crash intersections, this facility also has four intersections with 16-30 crashes.

Figure 7 – Number and Location of Crash Intersections

TABLE 2
Intersection Crashes [1]

Intersection Information		Crash Type Percent						Crash Summary	
Intersection Location	Intersection Control	Rear End	Sideswipe	Right Angle	Run off Road	Left-Turn Into Oncoming Traffic	Other	Total Crashes	Percent Injury Crashes
TH 22 and TH 14 [3] [4]	Interchange	62	3	18	0	0	18	34	26
TH 22 and Adams Street [3] [4]	Signal	50	3	25	0	7	15	60	37
TH 22 and Madison Avenue [3] [4]	Signal	64	0	11	2	0	23	44	20
Madison and Sioux Road	Signal	14	4	37	0	22	24	51	43
Madison and Raintree Drve	Signal	18	2	44	0	14	23	57	32
Madison and Victory Drive [3] [4]	Signal	58	3	22	0	0	17	36	33
Madison and Long Street	Signal	60	0	13	2	6	19	48	40
Madison and Broad Street	Signal	26	3	39	3	6	23	31	32
Madison and Riverfront Drive	Signal	22	9	19	9	13	28	32	22
Main St and 4th Street [2]	Signal	7	0	70	0	0	23	43	49
Warren St. and Riverfront Drive	Signal	28	8	31	0	8	26	39	21
TH 14 and TH 169	Interchange	36	9	13	9	2	31	45	27

(1) Crashes from the Minnesota Department of Public Safety 1999 through 2001
(2) No mast arms for northbound 4th Street signal; mast arms scheduled for installation in 2003
(3) Signal timing was modified in 2002; crash trends may change as a result
(4) Protected signal phasing
(5) Protected signal phasing, but changing to protected/permissive for northbound Victory in the fall of 2003

- **Main Street and Fourth Street:** Main Street is four-lane urban facility from the intersection of Fourth Street to Riverfront Drive. Fourth Street is a two-lane, one-way street that runs parallel to Riverfront Drive through downtown Mankato. A majority, 70 percent, of the incidents at this intersection are right-angle crashes. The next highest category was rear-end crashes (7 percent). Injuries resulted in 49 percent of the crashes, with one being severe. This signalized intersection is located on a hill and is closely spaced to another signalized intersection at Mulberry Street. There is speculation that some of the crashes are due to drivers reacting to the signal at Mulberry Street (next intersection) rather than the Fourth Street signal. The traffic signal located at Main Street and Fourth Street does not have mast arms that extend over the roadway. This makes it less visible than the traffic signal at Mulberry Street, which has mast arms. Due to the high percent of right-angle crashes and the fact that half of the crashes result in injuries, the City should consider installing new posts with mast arms or, in the interim, it may be possible to put extenders on the existing traffic signal heads to move them slightly over the roadway. It should be noted that the number of crashes along Main Street, including the intersection with Fourth Street, have decreased since they were reported in the original MATAPS plan.

- **Warren Street and Riverfront Drive:** Warren Street is a two-lane, one-way street that carries traffic from Riverfront Drive to the Minnesota State University campus. Traffic volumes on Warren Street range between 6,400 and 15,200 vehicles per day. Riverfront Drive is a four-lane divided facility that runs parallel to the Minnesota River. Traffic volumes on this section of Riverfront Drive range between 14,470 and 16,100 vehicles per day. This signalized intersection has a high number of right-angle crashes (31 percent). The next highest category was rear-end crashes (28 percent) with the "other" category following closely with 26 percent. Injury crashes occurred in 21 percent of the crashes.

- **TH 14 and TH 169 Interchange:** The TH 14/TH 169 interchange had a high number of crashes over the three-year period; however, the 45 crashes are a significant drop from the 82 that were reported in the previous plan. It is anticipated that as improvements are made to the interchange, the number of crashes will continue to decrease. Crashes at this intersection are characterized by a high percentage of rear-end crashes (36 percent). The next highest category was the "other" category (31 percent). Rear-end crashes contributed the greatest number of injury crashes (27 percent).

In general, a high percentage of rear-end crashes indicate that drivers are forced to make sudden stops. This can be caused by stop-and-go traffic in congested areas, areas where there is a lot of access and areas where drivers have a difficult time anticipating the maneuvers of other vehicles. In order to reduce the number of rear-end crashes, signal timing should be evaluated and access spacing should be reviewed to determine if consolidation or closure of access points can improve driver expectancy and reduce the risk of crashes.

Traffic signals should reduce or eliminate right-angle crashes. Based on the analysis, there seems to be an inordinate amount of right-angle crashes at signal locations. The majority of signals have been retimed in Mankato (2002); however, the City should place special emphasis on enforcement to ensure that drivers are not running red lights.

Segment Crash Analysis

While a majority of crashes occur at high-conflict locations such as intersections, it is also important to look at crashes along roadway segments. The intent of conducting a segment safety analysis is to identify abnormally high-crash segments. While numerous factors (i.e., geometric or cross-section deficiencies, sight distance problems, excessive access, etc.) contribute to crashes, a segment analysis can help identify potential problems so that further investigations and analysis can be done. In addition, segments can be targeted for safety improvements and investments.

In order to identify segments with high crash rates, a comparison was made between average crash rates by facility type and the rates for each individual segment in the study area (Table 3). While the ratio of segment crash rates to average crash rates identifies potential safety problem areas, it does not account for variations caused by short segment lengths and low traffic volumes. In order to account for these variations, an additional set of criteria was applied (require more than four crashes per mile per year). For the purposes of this study, high-crash segments have been identified as segments that have a crash rate ratio greater than 1.5 times the average crash rate and a crash frequency of more than four crashes per mile, per year. Using these criteria, high crash segments were identified and are shown on Figure 8. The dashed lines shown on Figure 8 indicate locations where the crash rate ratio is 1.5 or more, but there are fewer than four crashes per mile, per year.

When reviewing the high-crash segment map, remember the following:

- Short highway segments can result in high crash rates.
- Segments with low traffic volumes are subject to more variability (a small number of crashes can result in a high crash rate).
- Different types of highway facilities have different crash rates. For example, the average crash rate of a non-interstate freeway is 0.6 crashes per million vehicle-miles, while a rural, two-lane county road has an average crash rate of 1.25.

Based on the analysis, it is recommended that the partners consider the crash analysis results in selecting improvement projects. Given the limitations of the planning-level crash analysis for intersection and segment crashes, a review of the crash reports should be completed to help identify specific improvements.

TABLE 3
Segment Crash Rates

Type of Facility	(1) MATAPS Non-Junction Severity Rate	(2) Comparison 1997-1999 Non-Junction Severity Rates
U-1 = Urban 2-lane Local	2.59	NA
U-2 = Urban 2-lane One Way	6.57	6.49
U-3 = Urban 2-lane Arterial	1.87	1.42
U-4 = Urban 3-lane	2.99	1.72
U-5 = Urban 4-lane (30 mph)	3.00	1.9 – 4.2
U-6 = Urban 4-lane Expressway	0.78	0.93
U-7 = Urban Freeway	1.09	0.89
R1-A = Rural 2-lane Trunk Highway	0.38	1.30
R1 = Rural 2-lane Local	0.94	1.25
R2 = Rural 2-lane (3)	2.00	NA
R3 = Rural 4-lane Expressway	0.79	0.90
R4 = Non-interstate Freeway	NA	0.60

Notes:

(1) MATAPS rates are based on analysis of Department of Public Safety Data for the Mankato Area. Averages were developed for different facility types within the study area using 1999-2002 data.

(2) Comparison rates are based on 1998 to 2002 Mn/DOT average crash and severity rates, and 1997 to 999 crash rates from Hennepin County.

(3) Two-lane rural highways with limited sight distance and poor geometrics.

NA = information not available.

Figure 8 – Segment Crash Locations

2.6 MULTIMODAL TRANSPORTATION

The study area has a wide variety of transportation uses including trucking, railroads, transit, aviation and bicycle/pedestrians. The existing multimodal uses are summarized below:

Trucking

One of the major sources of trucking in the study area is the seasonal movement of agricultural commodities. Archer Daniels Midland (ADM) and Harvest States, two of the nation's largest processors of soybeans, have large facilities that attract beans from farms within a 50- to 100-mile radius. Between 200 and 400 truckloads of beans per day are brought into the Mankato area during peak processing periods. In addition, products in the form of livestock feed, soy oils and soy inks are shipped out of the plants 24 hours a day. Most of the shipping is by large trucks.

In addition to the movement of agricultural commodities, seasonal movement of aggregate materials from area quarries also contributes to truck traffic in the study area. Aggregate materials from Kasota, Le Sueur and other resources in the study area are moved by truck throughout southern Minnesota and even to northern parts of Iowa where there is a shortage of aggregate materials. Primary routes in and around the study area that are used to haul aggregate materials include TH 22, TH 14, TH 169, TH 60, Blue Earth County CSAH 5 and Le Sueur County CSAH 21. The demand for aggregate materials is anticipated to increase as the region grows in population and building and construction needs increase.

Manufacturing in the study area also contributes to truck traffic on the major roadways. WisPak, a local company that manufactures beverage products for Pepsi, receives over 7,500 loads of raw materials a year. Most of the raw materials it receives come in via large trucks. In addition to the materials it receives, the company sends out over 2,000 truck loads of finished product a year. On average, this results in 30 semi truck-loads a day, six days a week. It is anticipated that the number of trucks will increase in the future. Routes that are heavily used by manufacturers include TH 169, TH 14 and TH 22.

The number of trucks using some of the roadways in the study area has led to concerns for safety and mobility on these routes. For instance, TH 22 has experienced a significant growth in the number of vehicles on the roadway as commercial and residential development has increased in northeast Mankato. As the traffic has grown, the number of traffic signals has also increased. Trucks that use TH 22 as a north/south connection face an increasingly congested corridor with numerous stops. Slow-moving trucks and the inability to pass or get around these trucks, especially on the two-lane portions of TH 22, have led to safety concerns. In addition, school bus stops on this portion of TH 22 are also a concern.

Railroads

The growth in domestic and international markets has resulted in an increased demand to transport large volumes of bulk commodities. Railroads are one of the ways in which regional producers are able to get their goods to these markets efficiently. Railroads across the country have begun to upgrade their facilities to meet the need for moving commodities to international ports or shipping points. In addition, railroad companies have undergone significant cost adjustments and restructuring during the last 15 years. These changes have led to railroads

becoming more competitive with long-haul trucking operations and renewed financial health for the industry as a whole. Two railroads are currently operating within the study area, the Union Pacific (UP) Railroad and the Dakota Minnesota and Eastern (DM&E) Railroad Corporation. The rail facilities are identified in Figure 1 (page 1-3). The operations of these railroads are described in more detail below.

Union Pacific Railroad

In 2000, the UP operated approximately seven trains per day that average 60 to 100 cars in length. They predominately haul coal, quarry materials (fine sand) and grain. Currently, the UP railroad is making improvements to its tracks between Mankato and the Twin Cities. With the large investment that the UP is making, it is possible that there will be expansion of service along this corridor as well. However, no plans have been released to the public to date.

Dakota Minnesota and Eastern (DM& E) Railroad

In 2000, the DM&E operated five to six trains per day. One of the DM&E's largest shipping commodities, grain, is shipped from elevators in Minnesota and western states to river terminals in Winona. Other commodities include coal, manufactured goods, bentonite clay, cement and forest products.

Since the completion of the original MATAPS study, the DM&E has completed a Final Environmental Impact Statement (FEIS) for expansion and improvements to its rail lines in Minnesota and the Upper Midwest. The completion of this federally required document indicates DM&E's commitment to expand and increase its operations through the Mankato area. Expanded operations of the DM&E could mean that between 11 and 37 trains per day could be carrying up to 105 carloads of coal through the study area.

At the writing of this document, the DM&E rail line had two options for its expansion in the Mankato area. It could use the UP right-of-way through the City of Mankato (route it uses today) or it could construct a southern bypass of the City. The first option requires negotiations with UP; however, this option is anticipated to cost less than the second option and has fewer at-grade crossings. A decision from the railroad was not made before this report went to print.

Transit

Heartland Express is the transit provider in the Mankato area. Heartland Express is operated by the City of Mankato; however, it also provides service to North Mankato. Heartland Express provides bus transit to approximately 350,000 riders per year. Heartland Express services include a fixed-route system, a special "tripper-type" service to the Mankato Rehabilitation Clinic, and a "Mobility Bus" that offers dial-a-ride service for American with Disabilities Act-eligible citizens.

The existing route structure is a radial system, with most of the routes converging in downtown Mankato. The routes are intended to link downtown Mankato with North Mankato, Minnesota State University, River Hills Mall and residential areas of Mankato. An additional route is a campus express route that links student apartment complexes in the area with the Minnesota State University campus. A majority of the transit riders are Minnesota State University students, elderly individuals and physically challenged individuals.

In 2001, the City of Mankato undertook a study to evaluate its existing transit service. The study, "Transit Service and Operational Redesign Plan," provided a comprehensive review of community characteristics, existing transit activities and a comparison of similar systems data. In addition, a considerable amount of public input was solicited to understand the demand for transit services. Study recommendations included the following:

- Change routes where service is not being utilized
- Replace some existing fixed-route service with dial-a-ride service
- Enhance mobility bus services
- Create a hub area outside of downtown Mankato
- Restructure fare rates
- Improve coordination with River Hills Mall
- Improve arrangements with Minnesota State University
- Develop a citywide pass for Minnesota State University students
- Use smaller buses where appropriate
- Consider increasing service hours, especially for Minnesota State University routes
- Do not extend service to outer growth areas, it is inefficient at this time to do so

At this time, there are no plans to extend transit services to rural areas. However, a key need identified in previous transit and transportation studies was to provide service to the aging rural population. As rural citizens continue to age, their ability to operate a vehicle will decline while their need for transportation to medical and other services will increase.

The private sector has filled part of the gap for elderly drivers needing assistance to get to medical appointments. A few firms in the Mankato area provide non-emergency transportation to medical facilities in Mankato, the Twin Cities, Rochester and Waseca. The service provided by the local firms is similar to dial-a-ride service. Medical patients call the provider, who picks the patient up and delivers them directly to their appointment. It is anticipated that there will be an increased demand for these services as the population ages.

Aviation

The Mankato Airport is located on the northeast side of the City of Mankato. The airport is a regional facility for private planes, small commercial jets and limited cargo service. Currently, the airport has a dedicated cargo facility that provides daily service between Mankato and Sioux Falls, South Dakota. In addition to the above, the Mankato facility also provides pilot training in a program associated with Minnesota State University. A number of improvements, totaling over $9 million, are planned for the facility over the next few years. These improvements, including the extension of the runway, will allow for larger corporate jets and for carriers that may want to extend scheduled service to the airport.

According to a report prepared by Mn/DOT's Office of Aeronautics in March of 2001, it was anticipated that scheduled regional air service would be provided at the Mankato airport within one year. The terrorist attacks on September 11, 2001 and a sluggish economy thereafter hindered these efforts. At the present time, scheduled air service is not anticipated in the short term; long term, however, it is possible. Due to the lack of scheduled air service, there are a few locally operated transit airport shuttles that take passengers from the Mankato area to the Minneapolis-St. Paul International Airport. Shuttles are also provided to the Rochester airport, which has scheduled service.

Air cargo service is becoming an important concern for the entire state. It is estimated that the demand for air cargo activity in Minnesota will almost double by the year 2020. Due to space constraints and congestion near the Minneapolis-St. Paul International Airport, the issue has been raised as to whether an air cargo facility located outside of the Twin Cities would better serve the state. The City of Mankato indicated that it would be interested in providing an air cargo facility. Other communities interested in providing a large-scale air cargo facility included the City of St. Cloud and the City of Rochester.

A report released in November of 2002 by Mn/DOT's Office of Aeronautics and the Metropolitan Airports Commission indicated that for the foreseeable future, all major air cargo facilities will be located in the Twin Cities near the Minneapolis-St. Paul International Airport. The key rationale cited for this decision is the fact that the Minnesota area cannot compete with Chicago in terms of international access (number of flights) and economies of scale. Currently, a majority of Minnesota's international air cargo is flown into or out of Chicago's O'Hare Airport. Once in Chicago, international cargo may be flown to the Twin Cities or trucked to the Twin Cities, depending upon the time-sensitive nature of the product. Given the economies of scale associated with international cargo, the report found that it is unlikely that any Minnesota city outside of the Twin Cities would ever be able to fulfill the role of an international air cargo hub.

The report did identify three Greater Minnesota airports (Rochester, Duluth and International Falls) with development zones for a possible regional distribution center (RDC), which would act as statewide spokes to support the distribution hub. A RDC would consolidate international air cargo in order to provide service improvements and lower shipping costs. The criteria for a RDC is existing customs operations (international airports), which make them eligible for Foreign Trade Zone status. At this time, it is not feasible for the Mankato facility to operate as a RDC. However, Mankato could consolidate local air cargo for transport to a RDC.

Bicycle/Pedestrian

The 1991 Intermodal Surface Transportation Efficiency Act (ISTEA) required that multimodal needs be considered in the planning of transportation facilities. The Transportation Equity Act for the 21st Century (TEA-21), signed into law on June 9, 1998, builds on ISTEA by providing necessary funding, planning and policy tools to create more trails and greenways. TEA-21 continues and broadens provisions to improve facilities and safety for bicyclists and pedestrians, and to develop and maintain trails for both motorized and nonmotorized recreational users.

Pedestrians and bicyclists make up a limited percent of transportation trips; roughly 0.04 percent of all trips are taken on a bicycle. Although these trips are small in number, the federal

government and the state have made a commitment to provide adequate facilities for bicyclists and pedestrians to use. In 1999, the US Department of Transportation developed an objective to double the amount of bicycling and walking. At the state level, a majority of the paved rural roads are rated good or fair for bicycling. In addition to the roadway system in Greater Minnesota, there are approximately 225 miles of long-distance, off-road state bicycle trails through Greater Minnesota.

Although efforts have been made at the federal and state level, it is often local governmental units that provide and maintain pedestrian facilities, off-road bicycle trails and on-road bicycle facilities. As part of the planning process, city and county staff attempt to facilitate the development of trails and on-road bicycle facilities in conjunction with new development and upgrading of existing roadway facilities. While developing on-road bicycle facilities and trail systems, planners and engineers need to evaluate the types of users that could be accommodated by the facility. The types of users include the following:

- Type A – Advanced Bicyclists: Persons who are experienced riders comfortable traveling in most traffic conditions. These persons, in general, prefer to travel on streets rather than mixed-use trails. These riders desire direct access to schools, work, shopping and other destinations.

- Type B – Average Bicyclists: Persons who are casual or new adult and teen riders. These riders generally do not prefer to ride on roadways unless there is a designated lane. Destinations tend to be more recreational or leisure-related.

- Type C – Child Bicyclists: Young riders (preteen) whose bicycle use is generally monitored by parents.

Recreational Trails

Since the completion of the original MATAPS study, efforts have been made by study partners to connect to one another, to connect to state trails and to connect to regional parks and trail systems. The effort by the partners has been focused on identifying an integrated and coordinated trail system throughout the study area. Despite these efforts, there are still a number of gaps or missing sections between local and regional trails (Minnemishinona Falls, Sakatah and Red Jacket). Partners should continue to focus efforts on enhancing these connections, as well as connections to other recreational facilities such as local and regional parks. Figure 9 shows major existing off-road trails and signed and marked on-road trails in the study area.

As indicated above, partners should focus future trail connections in areas that link to regional trails and/or local and regional park facilities. Special consideration should be given to addressing bicycle and pedestrian needs on routes when planning transportation improvements. Individual agencies will need to consider numerous traffic operation factors (e.g., traffic volumes, speeds, sight distance, accesses, available space) and funding availability when determining the type of trail facilities (off-road versus on-road), and whether the recreational route is physically designated in the field.

Figure 9 – Existing Trails

On-Road Bicycle Facilities

While a concerted effort has been made to identify and construct recreational trail facilities, there has been less effort put forward to identify or enhance on-road bicycle facilities. On-road facilities are, as previously indicated, intended to provide Type A bicyclists with a means to use their bicycle as the preferred form of transportation to get to and from work, school, shopping and other destinations. This study recommends a more thorough examination of local roadway facilities to determine if they are appropriate for this type of bicycle use.

Although a future study of the area's road network is recommended, there are a few basic items that local agencies can take into consideration to get a general feel for whether a roadway is appropriate for bicycle transportation. The AASHTO *Guide for the Development of Bicycle Facilities* and Mn/DOT's design standards identify a number of factors in developing on-road bicycle facilities. These factors include, but are not limited to the following:

- Presence of shoulders in rural areas
- Width of shoulders
- Presence of rumble strips
- Total road width
- Lane width
- Traffic volumes
- Traffic speed

Other more subjective factors include:

- Facility continuity
- Facility connectivity to destination areas
- Terrain
- Presence of traffic signals and/or stop signs

Regardless of the route chosen, in urban areas it is especially important to identify facilities intended to serve bicycle transportation through striping, pavement markings or signing. Having some form of identification in place helps drivers and riders to be aware of the others' presence.